the substantially planar top surface to the oxidized peripheral region, and passivating each of the etched holes by an overlying moisture penetration barrier.

In the Amendment dated February 14, 2005, applicants explained the following points to the Examiner:

(1) One of ordinary skill in the art at the time the invention was made would not have been motivated to modify Thornton's structure to include Jiang's passivation layer 140 because Thornton's VCSEL already includes a silicon nitride passivation layer over the aperture region. Since the aperture region of Thornton's VCSEL already includes an overlying silicon nitride layer, one of ordinary skill in the art at the time the invention was made would not have seen any need to additionally include Jiang's passivation layer 140 over the aperture region in Thornton's VCSEL. Indeed, one of ordinary skill in the art at the time the invention was made reasonably would have concluded that such a modification of Thornton's VCSEL would have been redundant and would not have served any useful purpose.

(2) Even assuming only for the purpose of argument that there was sufficient motivation for one of ordinary skill in the art at the time the invention was made to modify Thornton's VCSEL in accordance with Jiang's teachings, the resulting combination would not correspond to the inventive method recited in claim 12. In particular, assuming only for the purpose of argument that one of ordinary skill in the art at the time the invention was made were to modify Thornton's VCSEL in accordance with Jiang's teachings, such a person would include the (redundant) passivation layer 140 only over the top electrode 132 and the aperture region circumscribed by the electrode 132 and would not have been motivated to extend the passivation layer 140 beyond the region (i.e., the aperture region 131) that Jiang teaches is sufficient to achieve his objective of mechanically and chemically protecting the light emitting device 100 (see col. 5, lines 53-56). Thus, in the resulting VCSEL structure, the passivation layer 140 would not overlie the etch holes 126 as asserted by the Examiner.

Point 1: One of ordinary skill in the art at the time the invention was made would not have been motivated to modify Thornton's structure to include Jiang's passivation layer 140

In the final Office action dated May 18, 2005, the Examiner responded to the first point as follows.

> In response to the applicant's arguments, the applicant argues Thornton teaches the aperture region of the VCSEL structure is passivated by a silicon nitride layer and therefore one of ordinary skill in the art would not need Jiang's passivation layer. However, the silicon nitride layer in Thornton is formed prior to etching the cavities (col. 6, Lines 12-1 5).

The Examiner, however, has misconstrued applicants' first point. The first point is not that "one of ordinary skill in the art would not need Jiang's passivation layer." Rather the point is that one of ordinary skill in the art at the time the invention was made would not have been motivated by the combined teachings of Thornton and Jiang to modify Thornton's VCSEL by including Jiang's passivation layer 140 over the aperture region of Thornton's VCSEL.

In particular, based on Thornton's teachings, one of ordinary skill in the art at the time the invention was made reasonably would have concluded that Thornton's VCSEL is passivated by the "uniform layer of silicon nitride [that is] deposited over the entire semiconductor sample" (col. 6, lines 3-5) after the upper DBR mirror 114 is formed. As acknowledged by the Examiner, Thornton does not even hint that there is a need to passivate the cavities 126 that are subsequently etched in the upper DBR mirror 114 in the areas outside of the aperture region.

Jiang does not make-up for the failure of Thornton to teach or suggest anything about passivating cavities of the type formed in Thornton's VCSEL. Indeed, Jiang's disclosure does not teach or suggest anything whatsoever about passivating such cavities. In Jiang's disclosure, passivation layers are not deposited on VCSEL's that include etch cavities and uniform layers of silicon nitride over the aperture region. That is, Jiang does not provide any guidance that would have led one of ordinary skill in the art at the time the invention was made to modify Thornton's very different VCSEL structure, which includes etch cavities and a uniform layer of silicon nitride over the aperture region, by depositing a redundant passivation layer over the aperture region.

As the Examiner is aware:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or

> suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not on applicants' disclosure.

MPEP § 706.02(j). Furthermore, as pointed out by the Patent Office Board of Appeals and Interferences:

> The examiner should be aware that "deeming" does not discharge [her] from the burden of providing the requisite factual basis and establishing the requisite motivation to support a conclusion of obviousness.

Ex parte Stern, 13 USPQ2d 1379 (BPAI 1989).

The Examiner repeatedly has explained her motivation for combining the teachings of Thornton and Jiang as follows:

> Since Thornton and Jiang et al. are both from the same field of endeavor, a method of manufacturing a vertical cavity surface emitting laser (VCSEL), the purpose disclosed by Jiang et al. would have been recognized in the pertinent art of Thornton. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Thornton by forming an overlying moisture penetration barrier as taught by Jiang et al. to chemically protect and passivate while allowing light to be emitted (col. 5, lines 53-56).

In the Amendment dated February 14, 2005, applicants explained that the fact that "Thornton and Jiang et al. are both from the same field of endeavor" is insufficient to establish a proper *prima facie* case of obviousness under 35 U.S.C. § 103. As a result, it appeared that the Examiner improperly has engaged in hindsight reconstruction of the claimed invention, using applicants' disclosure as a blueprint for piecing together prior art to defeat patentability.

In response to this conclusion, the Examiner has indicated that:

> In Response to Applicant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include know gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 443 F.2d 1392; 170 USPQ 209 (CCPA 1971 ).

The whole point, however, is whether the Examiner's conclusion of obviousness rests on knowledge gleaned only from applicants' disclosure. In particular, applicants have concluded that the Examiner must have engaged in improper hindsight reconstruction of the claimed invention based on the fact that neither Thornton nor Jiang provide any teaching or motivation that would have led one of ordinary skill in the art at the time the invention was made to the inventive method recited in claim 12. To make-up for this failure, the Examiner improperly must be relying on something gleaned only from applicants' disclosure or from some unstated source of information. If the Examiner is aware of facts within her personal knowledge that provide the requisite factual basis and establishes the requisite motivation to support her deemed conclusion that the features recited in claim 12 would have been obvious, the Examiner is requested to provide an affidavit in accordance with 37 CFR § 1.104(d)(2).

Point 2: The resulting combination of Thornton and Jiang would not correspond to the inventive method recited in claim 12

In the final Office action dated May 18, 2005, the Examiner has ignored the second point explained above. In fact, in both the first Office action dated November 17, 2004, and the final Office action, the Examiner has failed to address the fact that Jiang only teaches that the passivation layer 140 formed over the aperture surface 136 and the top conductor 130 circumscribing the aperture surface 136. Jiang does not even hint that depositing the passivation layer 140 over other regions of the planar VCSEL 205 would serve any useful purpose. Thus, when Jiang's passivation layer is deposited over Thornton's VCSEL in accordance with the Examiner's unsupported proposal, the passivation layer 140 would only overlie the aperture region; it would not overlie the etch holes 126, which are formed outside of the aperture region.

Applicants respectfully ask the Examiner to address this point in her next action.

Conclusion

For the reasons explained above, the Examiner's rejection of independent claim 12 under 35 U.S.C. § 103(a) over Thornton in view of Jiang should be withdrawn.

B. Claims 13-17

Each of claims 13-17 incorporates the features of independent claim 12 and therefore is patentable over Thornton and Jiang for at least the same reasons explained above.

III. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 50-1078.

Respectfully submitted,

Date: July 18, 2005

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